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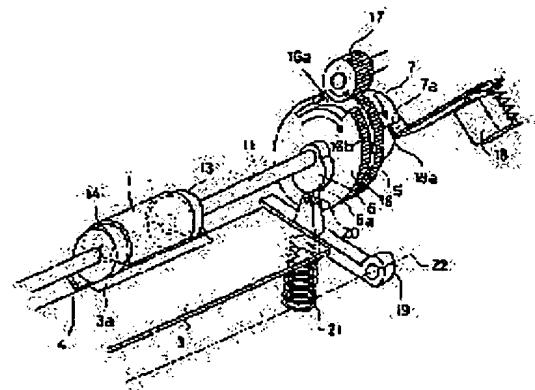
(21)Application number : 07-030504 (71)Applicant : CANON INC  
 (22)Date of filing : 20.02.1995 (72)Inventor : SAMEJIMA TAKAO

## (54) SHEET FEEDER AND IMAGE FORMING DEVICE

### (57)Abstract:

**PURPOSE:** To prevent a shift or noise due to a shock of collision and to prevent defective feeding of a sheet by controlling a jump of a sheet mounting plate.

**CONSTITUTION:** A sheet feeder is provided with a paper feeding shaft 11 which journals a semicircular paper feeding roller 1 and transmits driving force, an eccentric cam 6 fixed in the paper feeding shaft 11 so as to be journalled, a spring clutch gear 5 which is provided with a spring clutch mechanism interlocking with the rotation of the paper feeding shaft 11, and a paper feeding notched gear 16 which is fixed and journalled to the paper feeding shaft 11. When a notched gear part, 16a in the paper feeding notched gear 16 is opposed to a driving gear 17 meshing with the spring clutch gear 5, the eccentric cam 6 pushes down a paper feeding intermediate plate 3 to the lowermost position, and at the same time, the spring clutch gear 5 is held in a rotation free condition, while a gear part, 16b in the paper feeding notched gear 16 is geared with a driving gear 17 when drive transmission to the paper feeding shaft 11 is carried out by means of the spring clutch gear 5, so that the paper feeding shaft 11 is prevented from freely rotating in the drive transmission direction.



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## CLAIMS

## [Claim(s)]

[Claim 1] A sheet loading means which loaded a sheet and was supported movable between a feed location and a position in readiness, An elastic member which energizes said sheet loading means from a position in readiness to a feed location, Feed body of revolution for carrying out a pressure welding to a sheet currently loaded into said sheet loading means by energization force of said elastic member in a feed location, and sending out a sheet, A sheet feeding device characterized by having a rotating cam for resisting energization force of said elastic member and moving said sheet loading means to a position in readiness, and a roll control means which prepared a spring clutch and a toothless gear device for transmitting / intercepting a drive to said rotating cam in juxtaposition.

[Claim 2] Said spring clutch is arranged between a drive gear connected to a driving source, and a driving shaft of said rotating cam, and transfer/cutoff of a drive are controlled by solenoid. Said toothless gear device has said drive gear and a toothless gear which can be geared. A sheet feeding device according to claim 1 characterized by constituting so that said toothless gear may mesh with said drive gear, when transfer/cutoff of a drive are controlled according to a location of a toothless portion of this toothless gear and drive transfer is started by said solenoid.

[Claim 3] In a sheet feeding device which a sheet on this sheet installation board is pressed to feed body of revolution, and added \*\*\*\*\* to a sheet when a sheet installation board went up A feed shaft which transmits driving force while supporting said feed body of revolution to revolve, and an eccentric cam supported to revolve by fixing to said feed shaft in order to move said sheet installation board up and down, A sheet feeding device characterized by having a spring clutch device which controls rotation of said feed shaft, and a roll control means constituted so that said feed shaft might not become in the drive transfer direction with a rotation free-lancer.

[Claim 4] Said roll control means fixes and supports to revolve a toothless gear which has a toothless portion on said feed shaft. Said eccentric cam depresses said sheet installation board to the least significant in a drive gear on which a toothless portion of said toothless gear gears with a spring clutch gear prepared in said spring clutch, and a location which countered. a part for an owner tooth part of drive transfer on said feed shaft with said spring clutch, simultaneously said toothless gear -- said drive gear -- gearing -- a feed shaft -- the drive transfer direction -- rotation -- a sheet feeding device according to claim 3 characterized by constituting so that it may not become free.

[Claim 5] Said roll control means is a sheet feeding device according to claim 3 characterized by preparing an one-way clutch so that this feed shaft may not come with a rotation free-lancer in the drive transfer direction between said feed shafts and said spring clutches.

[Claim 6] Image formation equipment characterized by having a record means to form an image in a sheet with which any 1 term of claims 1-5 was fed from a sheet feeding device and said sheet feeding device of a publication according to image information.

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the sheet feeding device equipped with the gear rotation transport unit which transmits turning effort to pickup body of revolution etc. intermittently in the sheet feeding device which sends out one sheet at a time from the sheet hold sections, such as a sheet feed cassette of image formation equipments, such as a copying machine, a printer, and facsimile, and a multi-tray.

[0002]

[Description of the Prior Art] Image formation equipments, such as a copying machine, a printer, and facsimile, are equipped with the sheet feeding device for separating one loaded sheet at a time, and feeding the image formation section.

[0003] The conventional sheet feeding device is explained using drawing 9 – drawing 12. The perspective diagram showing the rotation drive transfer device of one-revolution control of a multi-feeding roller in which drawing 9 used the conventional spring clutch device, and drawing 10 are progress drawings of operation which looked at the transverse-plane cross section of drawing 9 , drawing 11, and drawing 12 from the side of drawing 9 . In drawing, the driving force of the drive gear 17 is transmitted to the feed roller 1 as rotational motion force of a one-revolution intermittent drive by the spring clutch gear 5 for a half moon.

[0004] The feed roller 1 and the eccentric cam 6 are being fixed to the feed shaft 11 for a half moon. In the condition before feed initiation The spring stop ring 8 is in the condition that the feed roller 1 is not in contact with the separation pad 4 for a half moon. And in the condition that the eccentric cam 6 is depressing the feed medium plate 3 to the least significant, positioning is carried out so that armature 18a of a solenoid 18 may be caught in notch 7a of the control ring 7, and it is fixed to the feed shaft 11 on the set screw 9.

[0005] At this time, it is in the condition that the spring for driving shaft 10 prepared between the control ring 7, the spring stop ring 8, and the spring clutch gear 5 loosened, and the spring clutch gear 5 is in a rotation free-lancer's condition to the feed shaft 11.

[0006] It is fixed to the medium plate arm 19, the feed medium plate 3 is formed rockable centering on the axis of rotation 22, and the koro 20 prepared in the medium plate arm 19 is forced on the eccentric cam 6 with the medium plate pressurization spring 21.

[0007] As shown in drawing 11, when partial 6a of the radius r centering on the feed shaft 11 is prepared and an eccentric cam 6 has the koro 20 in this 6a section, since the feed medium plate 3 is in the condition of having been depressed by the least significant and is committing the thrust with the medium plate pressurization spring 21 in the direction of a center of the feed shaft 11, the feed shaft 11 is maintaining balance, without rotating.

[0008] If it energizes to a solenoid 18 and armature 18a is now lengthened from the feed initiation standby condition of drawing 11, notch 7a of the control ring 7 will separate, the spring for driving shaft 10 in the control ring 7 rotates a little to feed shaft 11 hand of cut, and the spring clutch gear 5 and the spring stop ring 8 are bound tight.

[0009] Thereby, the feed roller 1 is united, and one revolution is made, and since notch 7a of the control ring 7 is again caught in armature 18a of a solenoid 18, rotation of the control ring 7 stops and a spring for

driving shaft 10 loosens after making one revolution, the spring clutch gear 5 serves as a rotation free-lancer, again for the spring clutch gear 5, an eccentric cam 6, the control ring 7, a spring for driving shaft 10, the spring stop ring 8, the feed shaft 11, and a half moon.

[0010] Here, if an eccentric cam 6 rotates and the koro 20 escapes from 6a portions of an eccentric cam 6 from the feed initiation standby condition of drawing 11, the feed medium plate 3 will have bounded until the maximum overlay side of the recording paper P loaded by the thrust of the medium plate pressurization spring 21 on the feed medium plate 3 runs against the circular portion of the feed roller 1 for the side koro 13 and 14 or a half moon.

[0011] In the drive transfer direction, since the eccentric cam 6 which rotates united with the half moon feeding roller 1, the feed shaft 11, and the spring stop ring 8 at this time is a rotation free-lancer, it rotates to the condition of drawing 12 in an instant by the thrust (the direction of arrow head a of drawing 11) of the medium plate pressurization spring 21 which works through the koro 20. In addition, the spring clutch gear 5 is the drive transfer direction and hard flow with the rotation free-lancer at this time.

[0012] Then, the recording paper P loaded on the feed medium plate 3 is pushed with the medium plate pressurization spring 21 to the circular portion of the feed roller 1 for a half moon, and is conveyed with rotation of the feed roller 1 for a half moon.

[0013]

[Problem(s) to be Solved by the Invention] In the above-mentioned conventional sheet feeding device, in order to carry out the intermittent drive of the rocking of the feed roller 1 and the feed medium plate 3 by the eccentric cam 6 on the same axle, the spring clutch device which consists of the spring clutch gear 5, the control ring 7, a spring stop ring 8, a spring for driving shaft 10, and a solenoid 18 was used for rotation of the feed roller 1 and a half moon for a half moon.

[0014] However, said spring clutch device is a rotation free-lancer in the hard flow of the drive transfer direction, and the eccentric cam 6 of the same axle had the problem of rotating in the drive transfer direction according to external force in the feed roller 1 and it for a half moon.

[0015] Namely, when the thrust of the medium plate pressurization spring 21 acts on an eccentric cam 6 through the koro 20, An eccentric cam 6 rotates without controlling the motion to which the feed medium plate 3 leaps up. The rebound of the feed medium plate 3 which leaped up with sufficient vigor is carried out in the feed roller 1 for the side koro 13 and 14 or a half moon. There was a problem that caused a poor feed, without applying suitable paper feeding pressure, became the cause of raising a poor image, such as image pitch nonuniformity, by Bure by the impact of a collision, or the noise occurred at the time of feeding.

[0016] This invention solves said technical problem, and the place made into the purpose makes it possible to prevent poor feed of a sheet while controlling jumping of a sheet installation board by making it a feed shaft not become in the drive transfer direction with a rotation free-lancer and preventing generating of Bure by the impact of a collision, or the noise.

[0017]

[Means for Solving the Problem] A typical configuration of a sheet feeding device concerning this invention for attaining said purpose A sheet loading means which loaded a sheet and was supported movable between a feed location and a position in readiness, An elastic member which energizes said sheet loading means from a position in readiness to a feed location, Feed body of revolution for carrying out a pressure welding to a sheet currently loaded into said sheet loading means by energization force of said elastic member in a feed location, and sending out a sheet, It is the sheet feeding device characterized by having a rotating cam for resisting energization force of said elastic member and moving said sheet loading means to a position in readiness, and a roll control means which prepared a spring clutch and a toothless gear device for transmitting / intercepting a drive to said rotating cam in juxtaposition.

[0018] Moreover, said spring clutch is arranged between a drive gear connected to a driving source, and a driving shaft of said rotating cam, and transfer/cutoff of a drive are controlled by solenoid. It is characterized by constituting said toothless gear device so that said toothless gear may mesh with said drive gear, when it has said drive gear and a toothless gear which can be geared, transfer/cutoff of a drive are controlled according to a location of a toothless portion of this toothless gear and drive transfer is started by said solenoid.

[0019] Moreover, it sets to a sheet feeding device which a sheet on this sheet installation board is pressed to feed body of revolution, and added \*\*\*\*\* to a sheet when a sheet installation board went up. A feed

shaft which transmits driving force while supporting said feed body of revolution to revolve, and an eccentric cam supported to revolve by fixing to said feed shaft in order to move said sheet installation board up and down. It is the sheet feeding device characterized by having a spring clutch device which controls rotation of said feed shaft, and a roll control means constituted so that said feed shaft might not become in the drive transfer direction with a rotation free-lancer.

[0020] Moreover, said roll control means fixes and supports to revolve a toothless gear which has a toothless portion on said feed shaft. Said eccentric cam depresses said sheet installation board to the least significant in a drive gear on which a toothless portion of said toothless gear gears with a spring clutch gear prepared in said spring clutch, and a location which countered. a part for an owner tooth part of drive transfer on said feed shaft with said spring clutch, simultaneously said toothless gear -- said drive gear -- gearing -- a feed shaft -- the drive transfer direction -- rotation -- it is characterized by constituting so that it may not become free.

[0021] Moreover, said roll control means is characterized by preparing an one-way clutch so that this feed shaft may not come with a rotation free-lancer in the drive transfer direction between said feed shafts and said spring clutches.

[0022] Moreover, image formation equipment concerning this invention is characterized by having said sheet feeding device and a record means to form an image in a sheet with which it was fed from said sheet feeding device according to image information.

[0023]

[Function] When the toothless gear which it has in a toothless portion fixes to a feed shaft as a roll control means so that feed body of revolution and the feed shaft with which the eccentric cam was fixed may not become in the drive transfer direction with a rotation free-lancer since the sheet feeding device concerning this invention was constituted like \*\*\*\*\*, rotation of a feed shaft controls by a part for the owner tooth part of said toothless gear gearing with a drive gear to drive transfer on said feed shaft of a spring clutch gear, and coincidence.

[0024] Moreover, as a roll control means, when an one-way clutch is prepared between a feed shaft and a spring clutch gear, an one-way clutch controls rotation of a feed shaft.

[0025] Moreover, image formation equipment equipped with the sheet feeding device concerning this invention demonstrates the operation which said sheet feeding device has, and it can record an image on the sheet with which it was fed good while it controls jumping of a sheet installation board and prevents Bure and the noise by the impact of a collision.

[0026]

[Example] While the laser beam printer equipped with the multi-feeding equipment of a DEYUPURO method and the cassette feeding equipment of a pawl separation method as an example of the sheet feeding device applied to this invention with drawing and image formation equipment is shown, the rotation drive transfer device of one-revolution control of a multi-feeding roller in which the spring clutch method was used as the sheet feeding device is shown.

[0027] Cross-section explanatory drawing of the laser beam printer equipped with the sheet feeding device which drawing 1 requires for this invention, the perspective diagram showing the one-revolution intermittent drive transfer device of the DEYUPURO type multi-feeding roller using a spring clutch device in the 1st example of the sheet feeding device which drawing 2 requires for this invention, and drawing 3 are the transverse-plane cross section of drawing 2, and progress drawing of operation which looked at drawing 4 - drawing 6 from the side of drawing 2. In addition, although the recording paper P is used as a sheet in the following explanation, it cannot be overemphasized that it can apply to the various sheets which otherwise consisted of synthetic resin etc.

[0028] drawing 1 -- setting -- multi-tray 400 the separation pad 4 separates into one sheet at a time the recording paper P which the recording paper P currently loaded was taken up by the feed roller 1 for the half moon used as feed body of revolution, and was conveyed -- having -- the top recording paper P -- the guide 51 before a register -- meeting -- a resist roller pair -- it is conveyed by 52.

[0029] moreover -- the same -- cassette 500 the separation pawl 12 separates into one sheet at a time the recording paper P which the recording paper P currently loaded was taken up by the feed roller 2 for the half moon used as feed body of revolution, and was conveyed -- having -- the top recording paper P -- the guide 51 before a register -- meeting -- a resist roller pair -- it is conveyed by 52.

[0030] and process cartridge 300 used as a record means rotation of the photo conductor drum 53 as an

electrophotography photo conductor arranged inside -- doubling -- a resist roller pair -- the recording paper P is conveyed by 52 and the toner image on the photo conductor drum 53 is imprinted on the recording paper P with the imprint roller 54.

[0031] Then, the recording paper P is guided to the separation guide 55, the conveyance guide 56, and the entrance guide 57, it is heated and pressurized by the roller pair of a fixing roller 58 and the pressurization roller 59, and the toner image on the recording paper P is established as a permanent image.

[0032] At this time, since the recording paper P coils around a fixing roller 58, it is compulsorily separated by the separation pawl 60 and it is conveyed with the fixing delivery rollers 61 and 62, and it is conveyed along with the conveyance guide rib 64. furthermore, the recording paper P -- a conveyance roller pair -- pass the exhaust 68 which was conveyed by 65 along with the conveyance guides 66 and 67, and served as curl picking -- discharge loading is carried out on the face down tray T.

[0033] Next, the 1st example of the sheet feeding device concerning this invention is explained concretely. In drawing 2 and drawing 3, the driving force of the drive gear 17 is transmitted to the feed roller 1 as rotational motion force of a one-revolution intermittent drive by the spring clutch gear 5 for a half moon. The feed roller 1 and the eccentric cam 6, and the feed loss-of-teeth gear 16 are being fixed to the feed shaft 11 used as a feed shaft for a half moon.

[0034] It is in the condition that the feed roller 1 is not in contact with the separation pad 4 for a half moon, and the spring stop ring 8 is in the condition which is depressing the feed medium plate 3 with which an eccentric cam 6 moreover serves as a sheet installation board to the least significant, and as shown in drawing 4, positioning of it is carried out so that armature 18a of a solenoid 18 may be caught in notch 7a of the control ring 7, and it is being fixed to the feed shaft 11 on the set screw 9.

[0035] At this time, it is in the condition that the spring for driving shaft 10 prepared between the control ring 7, the spring stop ring 8, and the spring clutch gear 5 loosened, and the spring clutch gear 5 is in a rotation free-lancer's condition to the feed shaft 11. Moreover, since the toothless partial 16a section is being fixed to the feed shaft 11 in the location which countered with the drive gear 17, the rotation driving force of the drive gear 17 is not transmitted for the feed loss-of-teeth gear 16 to the feed shaft 11.

[0036] It is fixed to the medium plate arm 19, the feed medium plate 3 is formed rockable centering on the axis of rotation 22, and the koro 20 prepared in the medium plate arm 19 is forced on the eccentric cam 6 with the medium plate pressurization spring 21.

[0037] When partial 6a of the radius r centering on the feed shaft 11 is prepared as shown in drawing 4, and an eccentric cam 6 has the koro 20 in this 6a section, since the feed medium plate 3 is in the condition of having been depressed by the least significant and is committing the thrust with the medium plate pressurization spring 21 in the direction of a center of the feed shaft 11, the feed shaft 11 is maintaining balance, without rotating.

[0038] Moreover, it is prepared in both the sides of the feed roller 1 for a half moon in the condition which the side koro 13 and 14 can rotate freely on the feed shaft 11, and the separation pad 4 is attached rockable centering on the axis of rotation 23, and is pushed against the side koro 13 and 14 with the separation pad pressurization spring 15. Here, the diameter of the side koro 13 and 14 is a little more smallish than the diameter of the circular portion of the feed roller 1 for a half moon.

[0039] If it energizes to a solenoid 18 and armature 18a is now lengthened from the feed initiation standby condition shown in drawing 4, notch 7a of the control ring 7 will separate, the spring for driving shaft 10 in the control ring 7 rotates a little to a feed shaft hand of cut, and the spring clutch gear 5 and the spring stop ring 8 are bound tight.

[0040] By this, the feed roller 1 is united and makes one revolution for the spring clutch gear 5, an eccentric cam 6, the feed loss-of-teeth gear 16, the control ring 7, a spring for driving shaft 10, the spring stop ring 8, the feed shaft 11, and a half moon. Since notch 7a of the control ring 7 is again caught in armature 18a of a solenoid 18, rotation of the control ring 7 stops and a spring for driving shaft 10 loosens after making one revolution Again, a rotation free next door and the feed loss-of-teeth gear 16 come to the location where the toothless partial 16a section counters the drive gear 17 again, and the spring clutch gear 5 returns to the first condition.

[0041] If an eccentric cam 6 rotates and the koro 20 escapes from 6a portions of an eccentric cam 6 from the feed initiation standby condition of drawing 4, as shown in drawing 5, to an eccentric cam 6, turning effort will work in the direction of arrow head b of drawing 5 through the koro 20 by the thrust of the medium plate pressurization spring 21.

[0042] however -- since the eccentric cam 6, simultaneously the feed loss-of-teeth gear 16 were also rotated unlike the conventional example mentioned above and owner tooth part part 16b of the feed loss-of-teeth gear 16 has started the drive gear 17 and engagement -- an eccentric cam 6, the feed shaft 11, and a half moon -- the feed roller 1 -- the drive transfer direction -- rotation -- a free condition does not become, but since it follows on the drive gear 17, it moves the koro 20 along with the outer diameter of an eccentric cam 6.

[0043] Therefore, the feed medium plate 3 goes up gently according to the timing of feeding, without having bounded with sufficient vigor with the medium plate pressurization spring 21, and the recording paper P on the feed medium plate 3 is pressed against the circular portion of the feed roller 1 for the side koro 13 and 14 or a half moon.

[0044] Then, the recording paper P loaded on the feed medium plate 3 is pushed against the circular portion of the feed roller 1 with the medium plate pressurization spring 21 for a half moon, and is conveyed with rotation of the feed roller 1 for a half moon. and as shown in drawing 6, the separation pad 4 separates at a time one sheet of recording paper P conveyed with the feed roller 1 for a half moon -- having -- the top recording paper P -- the guide 51 before a register -- meeting -- a resist roller pair -- it is conveyed by 52.

[0045] Next, the 2nd example of the sheet feeding device concerning this invention is explained using drawing 7 and drawing 8. In addition, what was constituted from same member as said 1st example attaches the same sign, and omits explanation. The perspective diagram and drawing 8 which show the one-revolution intermittent drive transfer device of the DEYUPURO type multi-feeding roller using a spring clutch device in the 2nd example of the sheet feeding device which drawing 7 requires for this invention are the transverse-plane cross section of drawing 7.

[0046] An one-way clutch 24 is formed between the spring clutch gear 5 and the feed shaft 11, and it is made for the feed shaft 11 not to become in the drive transfer direction with a rotation free-lancer in drawing 7. In the condition before feed initiation of drawing 7, the spring clutch gear 5 is a rotation free-lancer only in the drive transfer direction to the feed shaft 11.

[0047] If it energizes to a solenoid 18 and armature 18a is lengthened from this condition, notch 7a of the control ring 7 will separate, the spring for driving shaft 10 in the control ring 7 rotates a little to feed shaft 11 hand of cut, and the spring clutch gear 5 and the spring stop ring 8 are bound tight.

[0048] Thereby, the feed roller 1 is united, and one revolution is made, and after making one revolution, since notch 7a of the control ring 7 is again caught in armature 18a of a solenoid 18, rotation of the control ring 7 stops and a spring for driving shaft 10 loosens, the spring clutch gear 5 becomes only in the drive transfer direction with a rotation free-lancer again for the spring clutch gear 5, an eccentric cam 6, the control ring 7, a spring for driving shaft 10, the spring stop ring 8, the feed shaft 11

[0049] Moreover, since it is in a lock condition and the eccentric cam 6 is also in the lock condition in the drive transfer direction in the drive transfer direction to the spring clutch gear 5 by work of an one-way clutch 24, since a rotation free-lancer's condition does not become in the drive transfer direction but the feed roller 1 follows on the drive gear 17 through the spring clutch gear 5, in a feed shaft 11, the koro 20 moves it along with the outer diameter of an eccentric cam 6 for an eccentric cam 6, a feed shaft 11,

[0050] Therefore, like the above-mentioned, the feed medium plate 3 goes up gently according to the timing of feeding, without having bounded with sufficient vigor with the medium plate pressurization spring 21, and the recording paper P on the feed medium plate 3 is pressed against the circular portion of the feed roller 1 for the side koro 13 and 14 or a half moon.

[0051] In addition, although said each example explained the case where the sheet feeding device concerning this invention was applied to the multi-feeding equipment of the DEYUPURO method relevant to the feed roller 1 for a half moon, it is also possible to apply to the cassette feeding equipment relevant to the feed roller 2 for the half moon similarly shown in drawing 1.

[0052]

[Effect of the Invention] Since the sheet feeding device concerning this invention has the configuration and operation like \*\*\*\*, it controls rotation of a feed shaft easily as a roll control means by setting a feed shaft as the toothless gear which has a toothless portion for a fixed addition so that feed body of revolution and the feed shaft with which the eccentric cam was fixed do not become in the drive transfer direction with a rotation free-lancer.

[0053] That is, even if the thrust of the pressurization spring which pushes up a sheet installation board

through the koro to an eccentric cam acts, the amount of [ of a toothless gear ] owner tooth part gears with a drive gear, an eccentric cam rotates according to rotation of a drive gear, and a sheet installation board carries out rise actuation according to rotation of an eccentric cam.

[0054] Moreover, an one-way clutch controls rotation of a feed shaft by preparing an one-way clutch between a feed shaft and a spring clutch gear as said roll control means, and a sheet installation board carries out rise actuation according to rotation of an eccentric cam because an eccentric cam rotates according to rotation of a drive gear.

[0055] The following effects are acquired by the sheet feeding device equipped with each above-mentioned roll control means.

[0056] 1. There is no rebound of the sheet installation board by the collision to the side koro or feed body of revolution, and since \*\*\*\*\* stabilizes and acts, poor feed is mitigable.

[0057] 2. Since there is not Bure by said collision, don't raise a poor image, such as image pitch nonuniformity by the shock at the time of feed.

[0058] 3. Since said collision cannot be found, it is [ no noise at the time of feed ] and is quiet.

[0059] Moreover, image formation equipment equipped with said sheet feeding device can record an image on the sheet with which demonstrated the operation which said sheet feeding device has, and it was fed. Therefore, there is little generating of the noise, there is little poor feed, and a poor image can offer little image formation equipment.

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## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

[Drawing 1] It is cross-section explanatory drawing of the laser beam printer equipped with the sheet feeding device of a DEYUPURO method.

[Drawing 2] It is the perspective diagram showing the one-revolution intermittent drive transfer device of the DEYUPURO type multi-feeding roller using a spring clutch device in the 1st example of the sheet feeding device concerning this invention.

[Drawing 3] It is the transverse-plane cross section of drawing 2.

[Drawing 4] It is progress drawing of operation seen from the side of drawing 2.

[Drawing 5] It is progress drawing of operation seen from the side of drawing 2.

[Drawing 6] It is progress drawing of operation seen from the side of drawing 2.

[Drawing 7] It is the perspective diagram showing the one-revolution intermittent drive transfer device of the DEYUPURO type multi-feeding roller using a spring clutch device in the 2nd example of the sheet feeding device concerning this invention.

[Drawing 8] It is the transverse-plane cross section of drawing 7.

[Drawing 9] It is drawing explaining the conventional example.

[Drawing 10] It is drawing explaining the conventional example.

[Drawing 11] It is drawing explaining the conventional example.

[Drawing 12] It is drawing explaining the conventional example.

## [Description of Notations]

1 2 [ -- Spring clutch gear, ] -- A half moon feeding roller, 3 -- A feed medium plate, 4 -- A separation pad, 5 6 [ -- A spring stop ring 9 / -- Set screw, ] -- An eccentric cam, 7 -- A control ring, 7a -- A notch, 8 10 [ -- Side koro, ] -- A spring for driving shaft, 11 -- A feed shaft, 12 -- 13 A separation pawl, 14 15 -- A separation pad pressurization spring, 16 -- A feed loss-of-teeth gear, 16a -- A toothless portion, 16b [ -- Armature, ] -- A part for an owner tooth part, 17 -- A drive gear, 18 -- A solenoid, 18a 19 [ -- Axis of rotation, ] -- A medium plate arm, 20 -- The koro, 21 -- 22 A medium plate pressurization spring, 23 24 -- An one-way clutch, 51 -- A guide before a register, 52 -- Resist roller pair, 53 [ -- Conveyance guide, ] -- A photo conductor drum, 54 -- An imprint roller, 55 -- A separation guide, 56 57 [ -- Separation pawl, ] -- An entrance guide, 58 -- A fixing roller, 59 -- A pressurization roller, 60 61 62 [ -- A conveyance guide, 68 / -- The exhaust and 300 / -- A process cartridge and 400 -- A multi-tray and 500 --- / -- Recording paper / A cassette, T -- A face down tray, P ] -- A fixing delivery roller, 64 -- A conveyance guide rib, 65 -- 66 A conveyance roller pair, 67

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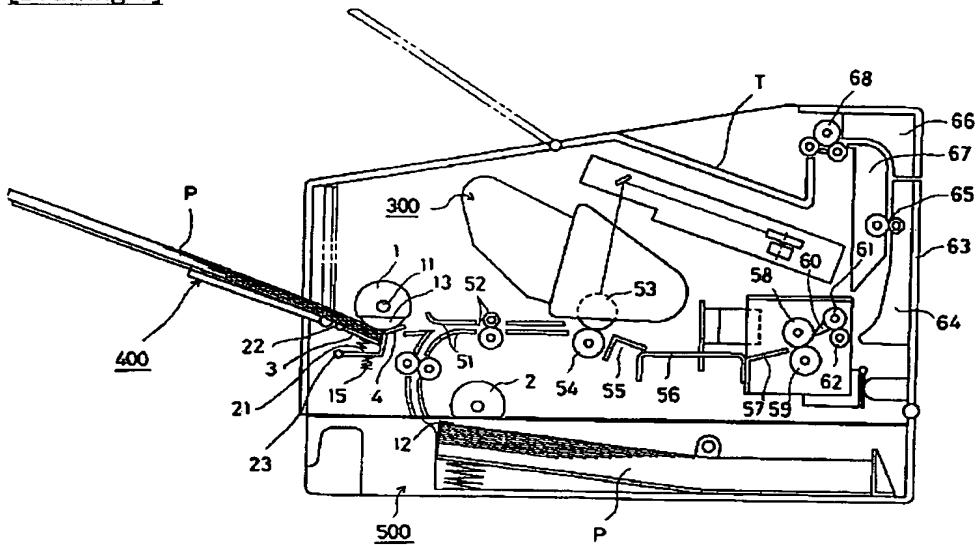
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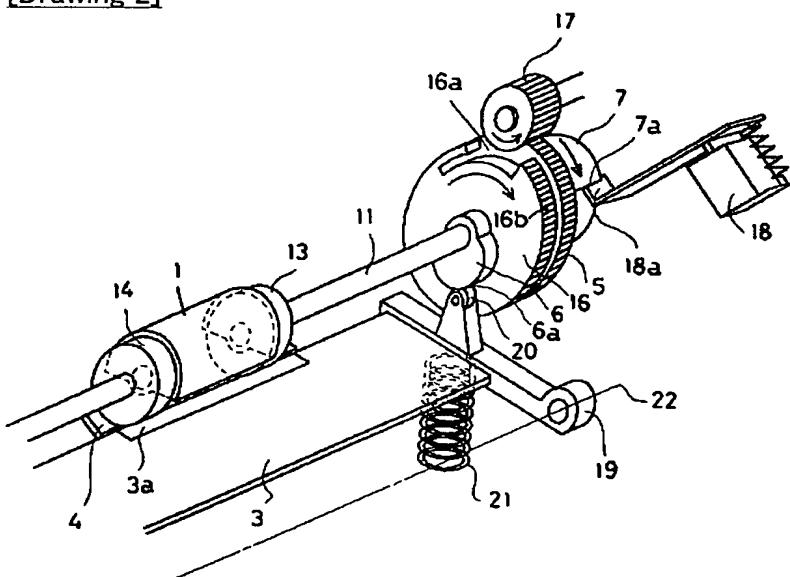
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## DRAWINGS

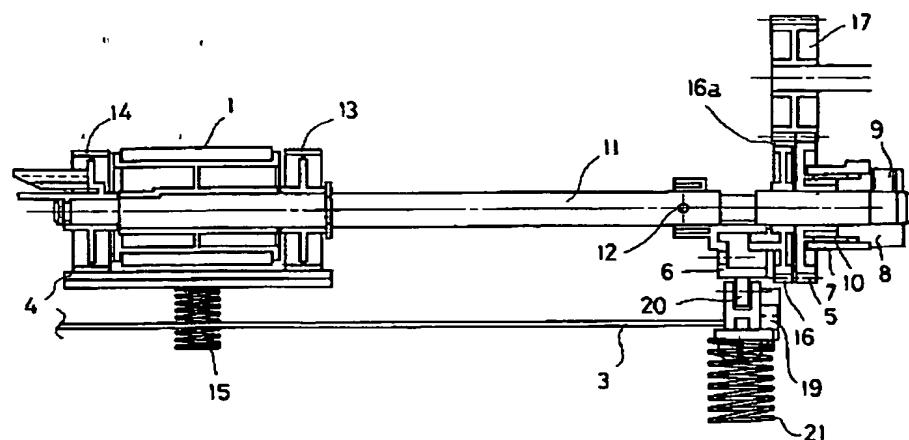
## [Drawing 1]



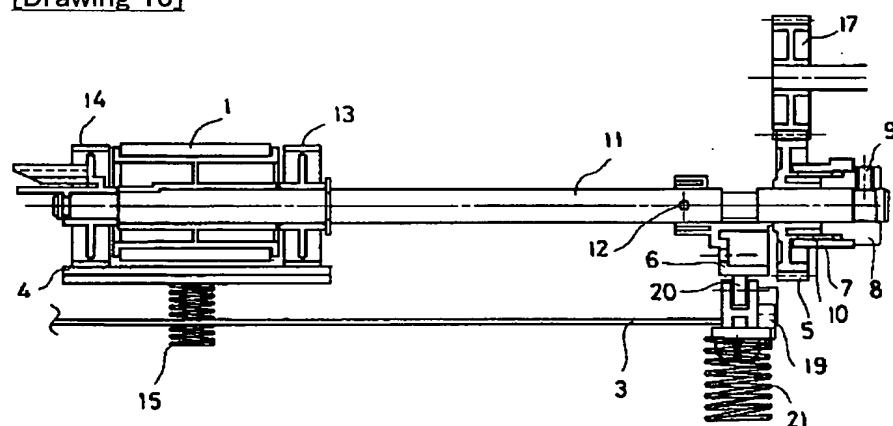
## [Drawing 2]



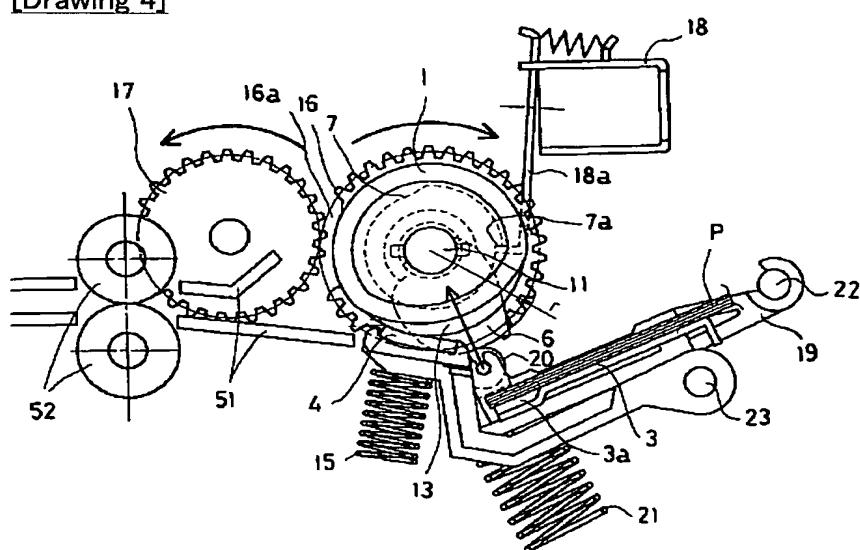
## [Drawing 3]



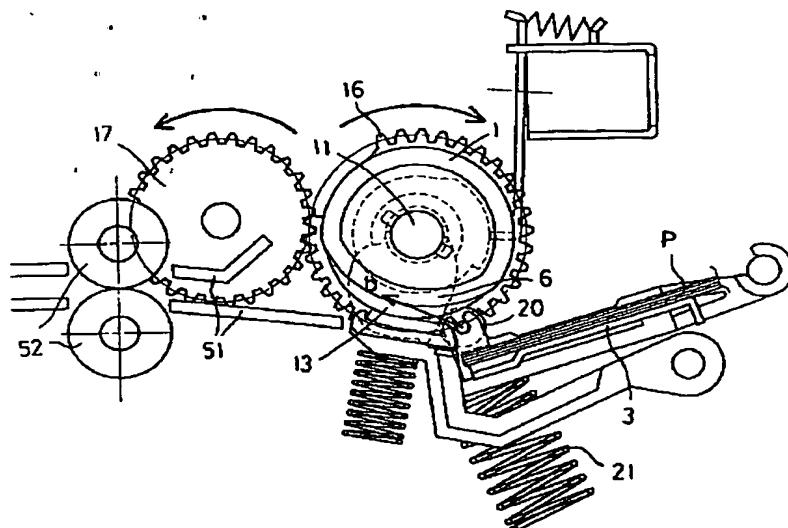
[Drawing 10]



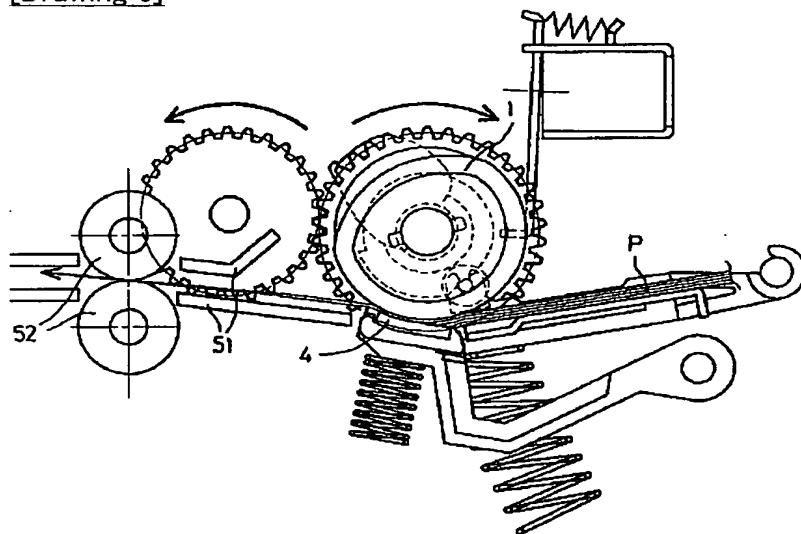
[Drawing 4]



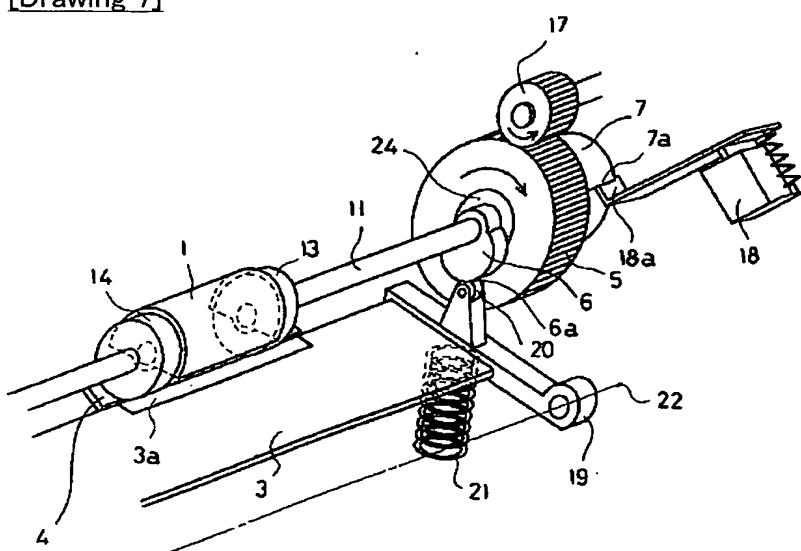
[Drawing 5]



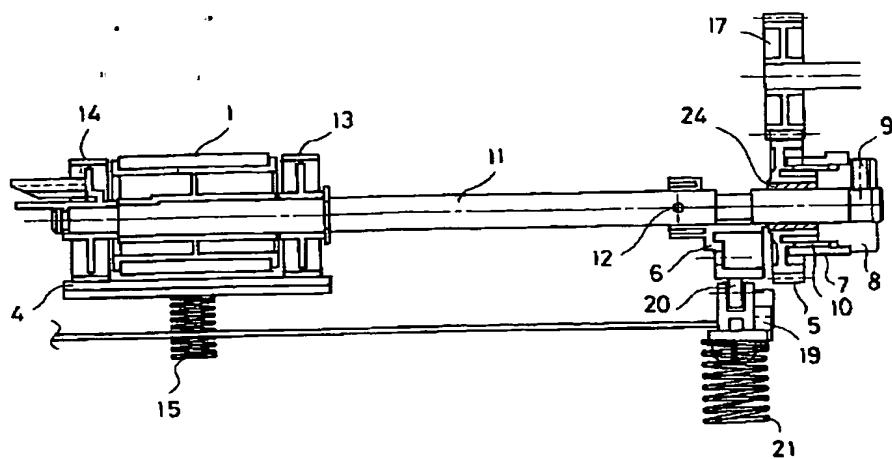
[Drawing 6]



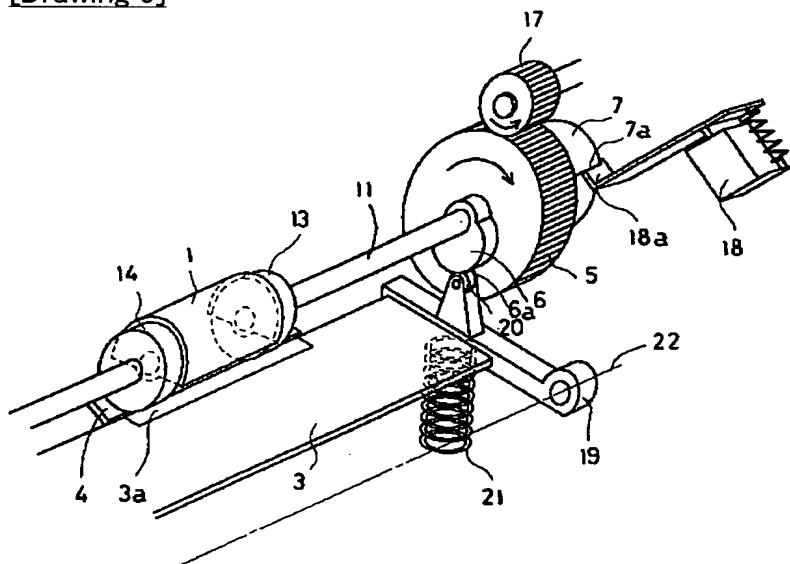
[Drawing 7]



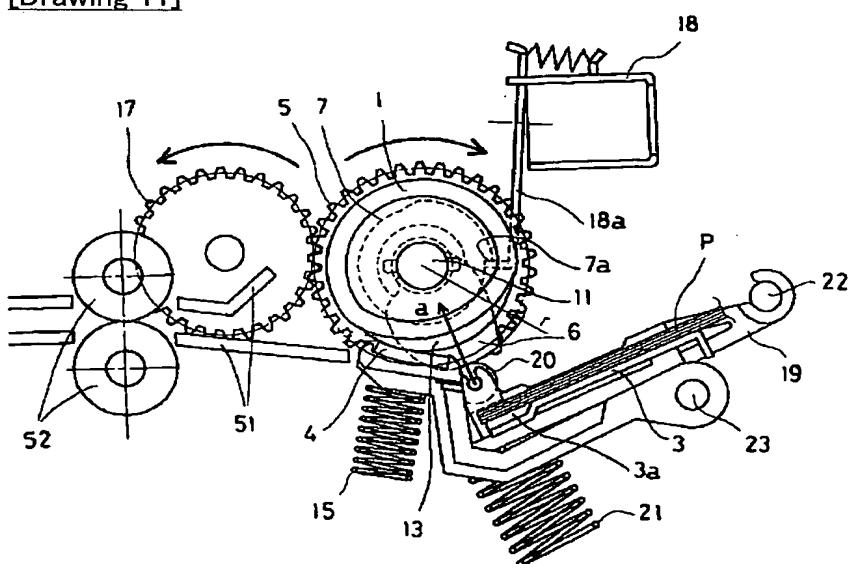
[Drawing 8]



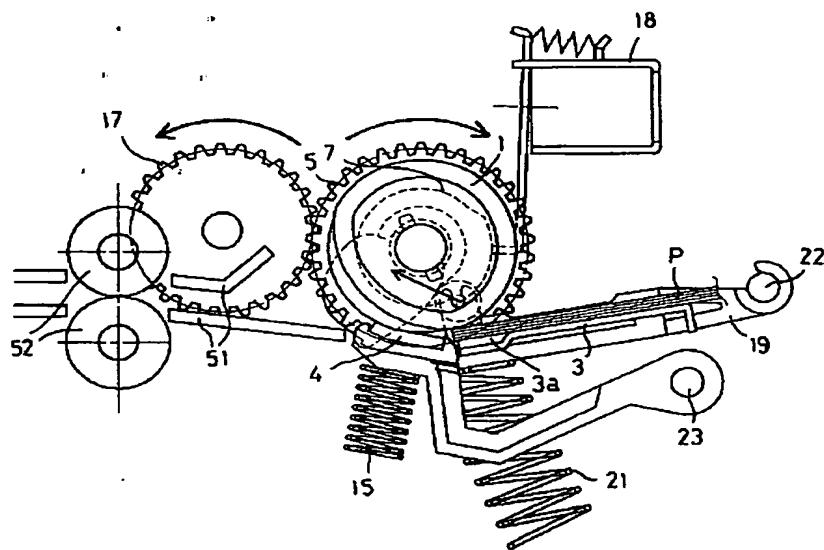
[Drawing 9]



[Drawing 11]



[Drawing 12]



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[Translation done.]

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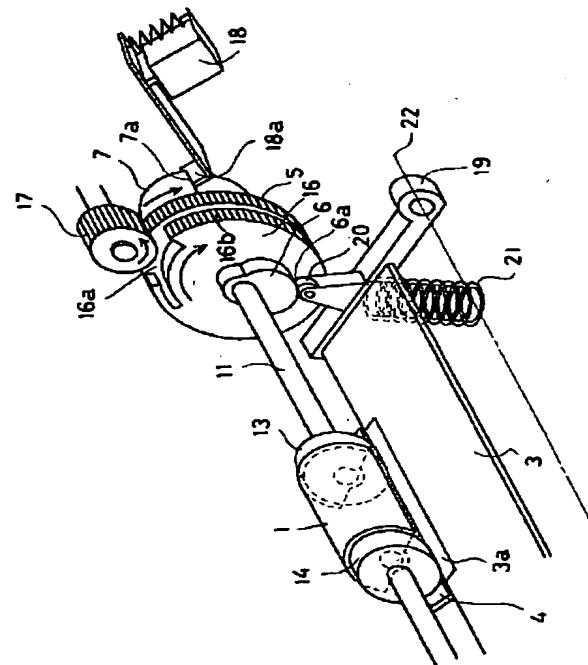
(74)代理人 弁理士 中川 周吉 (外1名)

(54)【発明の名称】 シート給送装置および画像形成装置

(57)【要約】 (修正有)

【目的】 シート載置板の跳ね上がりを制御して衝突の衝撃によるブレや騒音の発生を防止すると共に、シートの給送不良を防止することを可能にする。

【構成】 半月給紙ローラ1を軸支すると共に駆動力を伝達する給紙軸11と、給紙軸11に固定して軸支される偏心カム6と、給紙軸11の回転に連動するバネクラッチ機構を有するバネクラッチギア5と、給紙軸11に固定して軸支される給紙欠歯ギア16を有し、給紙欠歯ギア16の欠歯部分16aがバネクラッチギア5と噛み合う駆動ギア17と対向した位置で偏心カム6が給紙中板3を最下位に押し下げ、この時バネクラッチギア5は回転フリーの状態を保持すると共に、バネクラッチギア5の給紙軸11への駆動伝達と同時に給紙欠歯ギア16の有歯部分16bが駆動ギア17と噛み合って給紙軸11が駆動伝達方向に回転フリーとならないように構成した。



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## 【特許請求の範囲】

【請求項1】 シートを積載して給送位置と待機位置との間で移動可能に支持されたシート積載手段と、前記シート積載手段を待機位置から給送位置へ付勢する弹性部材と、前記弹性部材の付勢により給送位置において前記シート積載手段に積載されているシートに圧接してシートを送り出すための給送回転体と、前記シート積載手段を前記弹性部材の付勢に抗して待機位置に移動させるための回転カムと、前記回転カムへの駆動を伝達／遮断するためのバネクラッチ及び欠歯ギア機構を並列に設けた回転制御手段と、を備えたことを特徴とするシート給送装置。

【請求項2】 前記バネクラッチは駆動源に接続されている駆動ギアと前記回転カムの駆動軸との間に配置されてソレノイドにより駆動の伝達／遮断が制御され、前記欠歯ギア機構は前記駆動ギアと噛み合い可能な欠歯ギアを有し、該欠歯ギアの欠歯部分の位置に応じて駆動の伝達／遮断が制御され、前記ソレノイドにより駆動伝達を開始したときに前記欠歯ギアが前記駆動ギアと噛み合うように構成したことを特徴とする請求項1に記載のシート給送装置。

【請求項3】 シート載置板が上昇した際に該シート載置板上のシートが給送回転体に対して押圧されてシートに給送圧を付加するようにしたシート給送装置において、前記給送回転体を軸支すると共に駆動力を伝達する給送軸と、前記シート載置板を上下動させるために前記給送軸に固定して軸支される偏心カムと、前記給送軸の回転を制御するバネクラッチ機構と、前記給送軸が駆動伝達方向に回転フリーとならないよう構成した回転制御手段と、を有することを特徴としたシート給送装置。

【請求項4】 前記回転制御手段は、前記給送軸に欠歯部分を有する欠歯ギアを固定して軸支し、前記欠歯ギアの欠歯部分が前記バネクラッチに設けたバネクラッチギアと噛み合う駆動ギアと対向した位置で前記偏心カムが前記シート載置板を最下位に押し下げ、前記バネクラッチによる前記給送軸への駆動伝達と同時に前記欠歯ギアの有歯部分が前記駆動ギアと噛み合って給送軸が駆動伝達方向に回転フリーとならないように構成したことを特徴とする請求項3に記載のシート給送装置。

【請求項5】 前記回転制御手段は、前記給送軸と前記バネクラッチとの間に該給送軸が駆動伝達方向に回転フリーとならないようにワンウェイクラッチを設けたことを特徴とする請求項3に記載のシート給送装置。

【請求項6】 請求項1～5のいずれか1項に記載のシート給送装置と、前記シート給送装置から給送されたシ

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ートに画像情報を応じて画像を形成する記録手段と、を有することを特徴とする画像形成装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は複写機、プリンター、ファクシミリ等の画像形成装置のシート給送カセット、マルチトレイ等のシート収容部からシートを一枚ずつ送り出すシート給送装置において、ピックアップ回転体等に回転力を間欠的に伝達する歯車回転伝達装置を備えたシート給送装置に関するものである。

## 【0002】

【従来の技術】複写機、プリンタ、ファクシミリ等の画像形成装置には、積載されたシートを一枚ずつ分離して画像形成部へ給送するためのシート給送装置が備えられている。

【0003】従来のシート給送装置を図9～図12を用いて説明する。図9は従来のバネクラッチ機構を用いたマルチ給紙ローラの一回転制御の回転駆動伝達機構を示す斜視図、図10は図9の正面断面図、図11、図12は図9の20側面から見た動作経過図である。図において、半月給紙ローラ1には駆動ギア17の駆動力がバネクラッチギア5により一回転間欠駆動の回転力として伝達されるようになっている。

【0004】給紙軸11には半月給紙ローラ1および偏心カム6が固定されており、給紙開始前の状態では、バネ止め環8は半月給紙ローラ1が分離パッド4に接していない状態で、しかも偏心カム6が給紙中板3を最下位に押し下げている状態で、制御環7の切欠部7aにソレノイド18のアーマチュア18aが引っ掛かるように位置調整され、セットビス9で給紙軸11に固定されている。

【0005】この時、制御環7とバネ止め環8およびバネクラッチギア5との間に設けられたクラッチバネ10が緩んだ状態となっており、バネクラッチギア5は給紙軸11に対して回転フリーの状態となっている。

【0006】給紙中板3は中板アーム19に固定され回転軸22を中心に揺動可能に設けられており、中板アーム19に設けられたコロ20は偏心カム6に中板加压バネ21により押し付けられている。

【0007】偏心カム6は図11に示すように給紙軸11を中心とした半径rの部分6aが設けられこの6a部にコロ20がある時に給紙中板3は最下位に押し下げられた状態にあり、中板加压バネ21による押圧力は給紙軸11の中心方向に働いているので給紙軸11は回転することなくバランスを保っている。

【0008】今、図11の給紙開始待機状態よりソレノイド18に通電してアーマチュア18aを引くと制御環7の切欠部7aが外れ、制御環7の中にあるクラッチバネ10が給紙軸11回転方向に若干回転してバネクラッチギア5およびバネ止め環8を締め付ける。

【0009】これにより、バネクラッチギア5、偏心カ

ム6、制御環7、クラッチバネ10、バネ止め環8、給紙軸11、半月給紙ローラ1は一体となって一回転し、一回転した後は制御環7の切欠部7aが再びソレノイド18のアーマチュア18aに引っ掛けられ制御環7の回転が止まってクラッチバネ10が緩むのでバネクラッチギア5は再び回転フリーとなる。

【0010】ここで、図11の給紙開始待機状態より偏心カム6が回転して、コロ20が偏心カム6の6a部分から脱すると、給紙中板3は中板加圧バネ21の押圧力により給紙中板3上に積載された記録紙Pの最上紙面がサイドコロ13、14、或いは半月給紙ローラ1の円形部分に突き当たる迄跳ね上げられる。

【0011】この時、半月給紙ローラ1、給紙軸11、バネ止め環8と一体となって回転する偏心カム6は駆動伝達方向に回転フリーなので、コロ20を介して働く中板加圧バネ21の押圧力(図11の矢印a方向)により図12の状態まで瞬時に回転する。尚、この時、バネクラッチギア5は駆動伝達方向と逆方向に回転フリーとなっている。

【0012】その後、給紙中板3上に積載された記録紙Pは半月給紙ローラ1の円形部分に対して中板加圧バネ21により押し付けられ、半月給紙ローラ1の回転と共に搬送される。

#### 【0013】

【発明が解決しようとする課題】前述の従来のシート給送装置では、半月給紙ローラ1の回転および半月給紙ローラ1と同軸上の偏心カム6による給紙中板3の揺動を間欠駆動するためにバネクラッチギア5、制御環7、バネ止め環8、クラッチバネ10、ソレノイド18から構成されるバネクラッチ機構を用いていた。

【0014】しかしながら、前記バネクラッチ機構は駆動伝達方向の逆方向へは回転フリーであり、半月給紙ローラ1とそれに同軸の偏心カム6は外力により駆動伝達方向へ回転してしまうといった問題があった。

【0015】即ち、偏心カム6にコロ20を介して中板加圧バネ21の押圧力が作用した場合、偏心カム6は給紙中板3の跳ね上がる動きを制御することなく回転てしまい、勢いよく跳ね上がった給紙中板3はサイドコロ13、14或いは半月給紙ローラ1に当ってリバウンドし、適切な給紙圧がかからず給紙不良を起こしたり、衝突の衝撃によるブレで画像ピッチムラ等の画像不良を起こす原因となったり、給紙時に騒音が発生するという問題があった。

【0016】本発明は前記課題を解決するものであり、その目的とするところは、給送軸が駆動伝達方向に回転フリーとならないようにすることでシート載置板の跳ね上がりを制御して衝突の衝撃によるブレや騒音の発生を防止すると共に、シートの給送不良を防止することを可能にするものである。

#### 【0017】

【課題を解決するための手段】前記目的を達成するため

の本発明に係るシート給送装置の代表的な構成は、シートを積載して給送位置と待機位置との間で移動可能に支持されたシート積載手段と、前記シート積載手段を待機位置から給送位置へ付勢する弹性部材と、前記弹性部材の付勢力により給送位置において前記シート積載手段に積載されているシートに圧接してシートを送り出すための給送回転体と、前記シート積載手段を前記弹性部材の付勢力に抗して待機位置に移動させるための回転カムと、前記回転カムへの駆動を伝達／遮断するためのバネクラッチ及び欠歯ギア機構を並列に設けた回転制御手段と、を備えたことを特徴とするシート給送装置である。

【0018】また、前記バネクラッチは駆動源に接続されている駆動ギアと前記回転カムの駆動軸との間に配置されてソレノイドにより駆動の伝達／遮断が制御され、前記欠歯ギア機構は前記駆動ギアと噛み合い可能な欠歯ギアを有し、該欠歯ギアの欠歯部分の位置に応じて駆動の伝達／遮断が制御され、前記ソレノイドにより駆動伝達を開始したときに前記欠歯ギアが前記駆動ギアと噛み合うように構成したことを特徴とする。

【0019】また、シート載置板が上昇した際に該シート載置板上のシートが給送回転体に対して押圧されてシートに給送圧を付加するようにしたシート給送装置において、前記給送回転体を軸支すると共に駆動力を伝達する給送軸と、前記シート載置板を上下動させるために前記給送軸に固定して軸支される偏心カムと、前記給送軸の回転を制御するバネクラッチ機構と、前記給送軸が駆動伝達方向に回転フリーとならないように構成した回転制御手段と、を有することを特徴とするシート給送装置である。

【0020】また、前記回転制御手段は、前記給送軸に欠歯部分を有する欠歯ギアを固定して軸支し、前記欠歯ギアの欠歯部分が前記バネクラッチに設けたバネクラッチギアと噛み合う駆動ギアと対向した位置で前記偏心カムが前記シート載置板を最下位に押し下げ、前記バネクラッチによる前記給送軸への駆動伝達と同時に前記欠歯ギアの有歯部分が前記駆動ギアと噛み合って給送軸が駆動伝達方向に回転フリーとならないように構成したことを特徴とする。

【0021】また、前記回転制御手段は、前記給送軸と前記バネクラッチとの間に該給送軸が駆動伝達方向に回転フリーとならないようにワンウェイクラッチを設けたことを特徴とする。

【0022】また、本発明に係る画像形成装置は、前記シート給送装置と、前記シート給送装置から給送されたシートに画像情報を応じて画像を形成する記録手段と、を有することを特徴とする。

#### 【0023】

【作用】本発明に係るシート給送装置は、上述の如く構成したので、給送回転体と偏心カムが固定された給送軸が駆動伝達方向に回転フリーとならないように回転制御

手段として、欠歯部分を有する欠歯ギアを給送軸に固定した場合には、バネクラッチギアの前記給送軸への駆動伝達と同時に前記欠歯ギアの有歯部分が駆動ギアと噛み合うことにより給送軸の回転を制御する。

【0024】また、回転制御手段として、給送軸とバネクラッチギアとの間にワンウェイクラッチを設けた場合には、ワンウェイクラッチが給送軸の回転を制御する。

【0025】また、本発明に係るシート給送装置を備えた画像形成装置は、前記シート給送装置が有する作用を発揮して、シート載置板の跳ね上がりを制御して衝突の衝撃によるブレや騒音を防止すると共に、良好に給送されたシートに画像を記録することが出来る。

#### 【0026】

【実施例】図により本発明に係るシート給送装置および画像形成装置の一例としてデュプロ方式のマルチ給紙装置と、爪分離方式のカセット給紙装置を備えたレーザービームプリンタを示すと共に、そのシート給送装置としてバネクラッチ方式を用いたマルチ給紙ローラの一回転制御の回転駆動伝達機構を示す。

【0027】図1は本発明に係るシート給送装置を備えたレーザービームプリンタの断面説明図、図2は本発明に係るシート給送装置の第1実施例でバネクラッチ機構を用いたデュプロ式マルチ給紙ローラの一回転間欠駆動伝達機構を示す斜視図、図3は図2の正面断面図、図4～図6は図2の側面から見た動作経過図である。尚、以下の説明ではシートとして記録紙Pを用いているが、他に合成樹脂等で構成された各種シートに適用可能であることはいうまでもない。

【0028】図1において、マルチトレイ400に積載されている記録紙Pは、給送回転体となる半月給紙ローラ1によりピックアップされ搬送された記録紙Pは分離パッド4により一枚ずつに分離され、最上位の記録紙Pのみがレジ前ガイド51に沿ってレジストローラ対52に搬送される。

【0029】また、同様にカセット500に積載されている記録紙Pは、給送回転体となる半月給紙ローラ2によりピックアップされ搬送された記録紙Pは分離爪12により一枚ずつに分離され、最上位の記録紙Pのみがレジ前ガイド51に沿ってレジストローラ対52に搬送される。

【0030】そして、記録手段となるプロセスカートリッジ300内に配置された電子写真感光体としての感光体ドラム53の回転に合わせてレジストローラ対52により記録紙Pは搬送され、転写ローラ54により記録紙P上に感光体ドラム53上のトナー像が転写される。

【0031】その後、記録紙Pは分離ガイド55、搬送ガイド56、入口ガイド57にガイドされ定着ローラ58および加圧ローラ59のローラ対により加熱、加圧されて記録紙P上のトナー像が永久像として定着する。

【0032】この時、記録紙Pは定着ローラ58に巻き付くので分離爪60により強制的に分離され定着排紙ローラ

61、62により搬送され、搬送ガイドリブ64に沿って搬送される。更に記録紙Pは搬送ローラ対65により搬送ガイド66、67に沿って搬送されカール取りを兼ねた排出装置68を経てフェースダウントレイT上に排出積載される。

【0033】次に本発明に係るシート給送装置の第1実施例について具体的に説明する。図2および図3において、半月給紙ローラ1には駆動ギア17の駆動力がバネクラッチギア5により一回転間欠駆動の回転動力として伝達されるようになっている。給送軸となる給紙軸11には半月給紙ローラ1および偏心カム6、給紙欠歯ギア16が固定されている。

【0034】図4に示すように、給紙開始前の状態においては、バネ止め環8は半月給紙ローラ1が分離パッド4に接していない状態で、しかも偏心カム6がシート載置板となる給紙中板3を最下位に押し下げている状態で、制御環7の切欠部7aにソレノイド18のアーマチュア18aが引っ掛かるように位置調整され、セットビス9で給紙軸11に固定されている。

【0035】この時、制御環7とバネ止め環8およびバネクラッチギア5との間に設けられたクラッチバネ10が緩んだ状態となっており、バネクラッチギア5は給紙軸11に対して回転フリーの状態となっている。また、給紙欠歯ギア16はその欠歯部分16a部が駆動ギア17と対向した位置で給紙軸11に固定されているので、駆動ギア17の回転駆動力は給紙軸11に伝達されない。

【0036】給紙中板3は中板アーム19に固定され回転軸22を中心に揺動可能に設けられており、中板アーム19に設けられたコロ20は中板加圧バネ21により偏心カム6に押し付けられている。

【0037】偏心カム6は図4に示すように給紙軸11を中心とした半径rの部分6aが設けられ、この6a部にコロ20がある時に給紙中板3は最下位に押し下げられた状態にあり、中板加圧バネ21による押圧力は給紙軸11の中心方向に働いているので給紙軸11は回転することなくバランスを保っている。

【0038】また給紙軸11にはサイドコロ13、14が回転自在の状態で半月給紙ローラ1の両サイドに設けられ、分離パッド4は回転軸23を中心に揺動可能に取り付けられ、分離パッド加圧バネ15によりサイドコロ13、14に押し付けられている。ここで、サイドコロ13、14の直径は半月給紙ローラ1の円形部分の直径よりも幾分小さめになっている。

【0039】今、図4に示す給紙開始待機状態よりソレノイド18に通電してアーマチュア18aを引くと制御環7の切欠部7aが外れ、制御環7の中にあるクラッチバネ10が給紙軸回転方向に若干回転してバネクラッチギア5およびバネ止め環8を締め付ける。

【0040】これにより、バネクラッチギア5、偏心カム6、給紙欠歯ギア16、制御環7、クラッチバネ10、バネ止め環8、給紙軸11、半月給紙ローラ1は一体となっ

て一回転し、一回転した後は制御環7の切欠部7aが再びソレノイド18のアーマチュア18aに引っ掛かり、制御環7の回転が止まってクラッチバネ10が緩むので、バネクラッチギア5は再び回転フリーとなり、給紙欠歯ギア16はその欠歯部分16a部が再び駆動ギア17に対向する位置に来て最初の状態に戻る。

【0041】図4の給紙開始待機状態より偏心カム6が回転してコロ20が偏心カム6の6a部分から脱すると、図5に示すように偏心カム6には中板加圧バネ21の押圧力によりコロ20を介して図5の矢印b方向に回転力が働く。

【0042】しかし、前述した従来例と異なり偏心カム6と同時に給紙欠歯ギア16も回転して給紙欠歯ギア16の有歯部分16bが駆動ギア17と噛み合いを開始しているので偏心カム6、給紙軸11、半月給紙ローラ1は駆動伝達方向に回転フリーの状態とはならず、駆動ギア17に従動するのでコロ20は偏心カム6の外径に沿って移動する。

【0043】従って、給紙中板3は中板加圧バネ21により勢いよく跳ね上げられることもなく給紙のタイミングに合わせて緩やかに上昇し、給紙中板3上の記録紙Pがサイドコロ13、14或いは半月給紙ローラ1の円形部分に押し当たられる。

【0044】その後、給紙中板3上に積載された記録紙Pは半月給紙ローラ1の円形部分に中板加圧バネ21により押し付けられ、半月給紙ローラ1の回転と共に搬送される。そして半月給紙ローラ1により搬送された記録紙Pは図6に示すように分離パッド4により一枚ずつ分離され、最上位の記録紙Pのみがレジ前ガイド51に沿ってレジストローラ対52に搬送される。

【0045】次に本発明に係るシート給送装置の第2実施例について図7および図8を用いて説明する。尚、前記第1実施例と同じ部材で構成したものは同一の符号を付して説明を省略する。図7は本発明に係るシート給送装置の第2実施例でバネクラッチ機構を用いたデュプロ式マルチ給紙ローラの一回転間欠駆動伝達機構を示す斜視図、図8は図7の正面断面図である。

【0046】図7において、バネクラッチギア5と給紙軸11の間にワンウェイクラッチ24を設け、給紙軸11が駆動伝達方向に回転フリーとならないようにしたものである。図7の給紙開始前の状態において、バネクラッチギア5は給紙軸11に対し駆動伝達方向にのみ回転フリーである。

【0047】この状態よりソレノイド18に通電してアーマチュア18aを引くと制御環7の切欠部7aが外れ、制御環7の中にあるクラッチバネ10が給紙軸11回転方向に若干回転してバネクラッチギア5およびバネ止め環8を締め付ける。

【0048】これによりバネクラッチギア5、偏心カム6、制御環7、クラッチバネ10、バネ止め環8、給紙軸11、半月給紙ローラ1は一体となって一回転し、一回転

した後は、制御環7の切欠部7aが再びソレノイド18のアーマチュア18aに引っ掛けられ制御環7の回転が止まりクラッチバネ10が緩むのでバネクラッチギア5は再び駆動伝達方向にのみ回転フリーとなる。

【0049】また、給紙軸11はワンウェイクラッチ24の働きでバネクラッチギア5に対して駆動伝達方向にロック状態なので偏心カム6も駆動伝達方向にロック状態となっているため、偏心カム6、給紙軸11、半月給紙ローラ1は駆動伝達方向に回転フリーの状態とはならず、バネクラッチギア5を介して駆動ギア17に従動するのでコロ20は偏心カム6の外径に沿って移動する。

【0050】従って、前述と同様に給紙中板3は中板加圧バネ21により勢いよく跳ね上げられることもなく給紙のタイミングに合わせて緩やかに上昇し、給紙中板3上の記録紙Pがサイドコロ13、14或いは半月給紙ローラ1の円形部分に押し当たられる。

【0051】尚、前記各実施例では本発明に係るシート給送装置を半月給紙ローラ1に関連するデュプロ方式のマルチ給紙装置に適用した場合について説明したが、同20に図1に示す半月給紙ローラ2に関連するカセット給紙装置に対して適用することも可能である。

#### 【0052】

【発明の効果】本発明に係るシート給送装置は、上述の如き構成と作用とを有するので、給送回転体と偏心カムが固定された給送軸が駆動伝達方向に回転フリーとならないように回転制御手段として、欠歯部分を有する欠歯ギアを給送軸に固定追加することで容易に給送軸の回転を制御するものである。

【0053】即ち、偏心カムに対してコロを介してシート載置板を押し上げる加圧バネの押圧力が作用しても、欠歯ギアの有歯部分が駆動ギアに噛み合って偏心カムは駆動ギアの回転に従って回転し、シート載置板は偏心カムの回転に従って上昇動作する。

【0054】また、前記回転制御手段として、給送軸とバネクラッチギアとの間にワンウェイクラッチを設けることでワンウェイクラッチが給送軸の回転を制御し、偏心カムが駆動ギアの回転に従って回転することでシート載置板は偏心カムの回転に従って上昇動作する。

【0055】上記の各回転制御手段を備えたシート給送装置によって以下の効果が得られる。

【0056】1. サイドコロ或いは給送回転体への衝突によるシート載置板のリバウンドがなく、給送圧が安定して作用するので給送不良を軽減できる。

【0057】2. 前記衝突によるブレがないので、給送時のショックによる画像ピッチャ等の画像不良を起こすことがない。

【0058】3. 前記衝突がないので給送時の騒音がなく静かである。

【0059】また、前記シート給送装置を備えた画像形成装置は、前記シート給送装置が有する作用を發揮して

給送されたシートに画像を記録することができる。従つて、騒音の発生が少なく、給送不良が少なく、画像不良が少ない画像形成装置を提供できる。

【図面の簡単な説明】

【図1】デュプロ方式のシート給送装置を備えたレーザービームプリンタの断面説明図である。

【図2】本発明に係るシート給送装置の第1実施例でバネクラッチ機構を用いたデュプロ式マルチ給紙ローラの一回転間欠駆動伝達機構を示す斜視図である。

【図3】図2の正面断面図である。

【図4】図2の側面から見た動作経過図である。

【図5】図2の側面から見た動作経過図である。

【図6】図2の側面から見た動作経過図である。

【図7】本発明に係るシート給送装置の第2実施例でバネクラッチ機構を用いたデュプロ式マルチ給紙ローラの一回転間欠駆動伝達機構を示す斜視図である。

【図8】図7の正面断面図である。

【図9】従来例を説明する図である。

【図10】従来例を説明する図である。

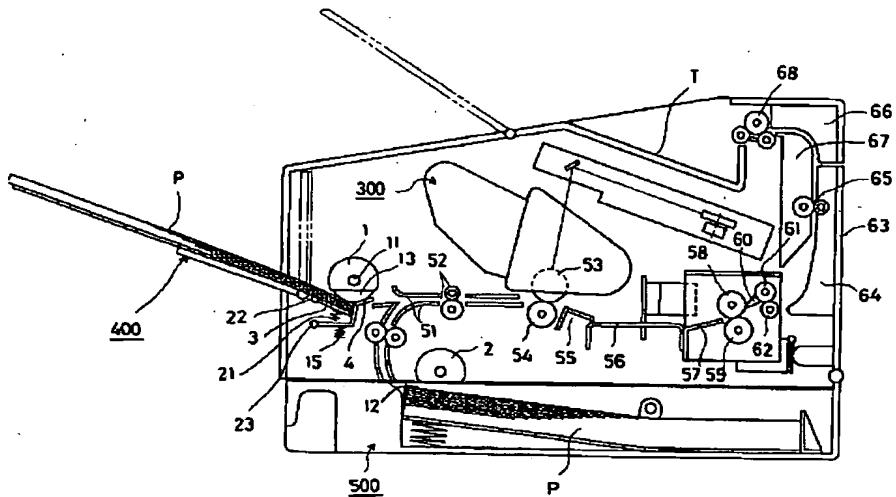
【図11】従来例を説明する図である。

【図12】従来例を説明する図である。

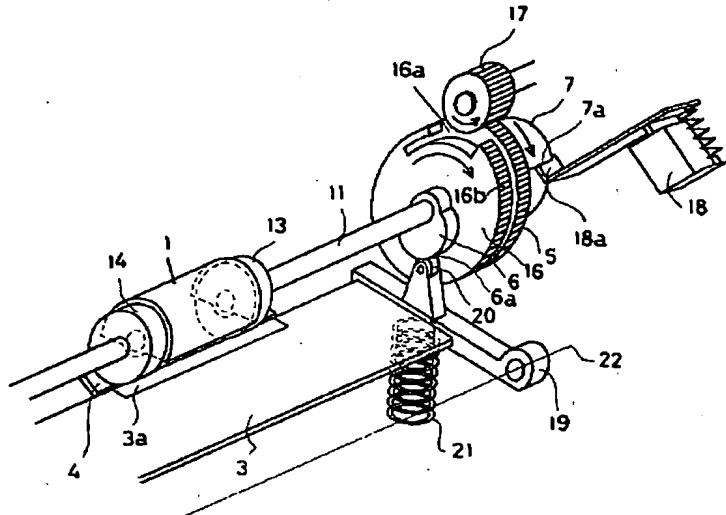
【符号の説明】

- 1, 2…半月給紙ローラ、3…給紙中板、4…分離パッド、5…バネクラッチギア、6…偏心カム、7…制御環、7 a…切欠部、8…バネ止め環、9…セットビス、10…クラッチバネ、11…給紙軸、12…分離爪、13, 14…サイドコロ、15…分離パッド加圧バネ、16…給紙欠歯ギア、16 a…欠歯部分、16 b…有歯部分、17…駆動ギア、18…ソレノイド、18 a…アーマチュア、19…中板アーム、20…コロ、21…中板加圧バネ、22, 23…回転軸、24…ワンウェイクラッチ、51…レジ前ガイド、52…レジストローラ対、53…感光体ドラム、54…転写ローラ、55…分離ガイド、56…搬送ガイド、57…入口ガイド、58…定着ローラ、59…加圧ローラ、60…分離爪、61, 62…定着排紙ローラ、64…搬送ガイドリブ、65…搬送ローラ対、66, 67…搬送ガイド、68…排出装置、300…プロセスカートリッジ、400…マルチトレイ、500…カセット、T…フェースダウントレイ、P…記録紙

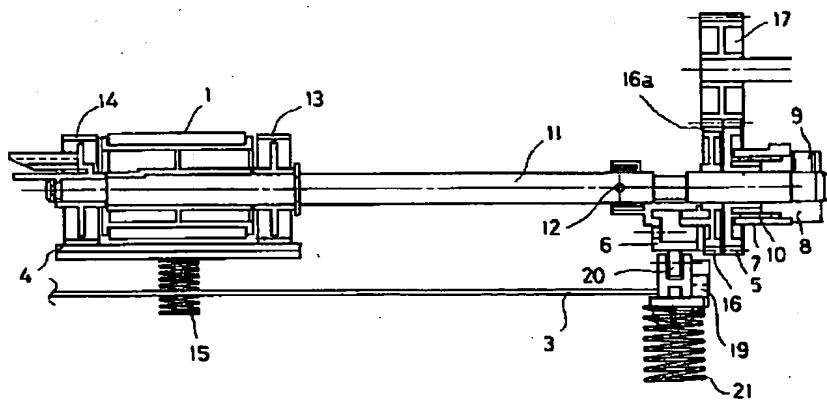
【図1】



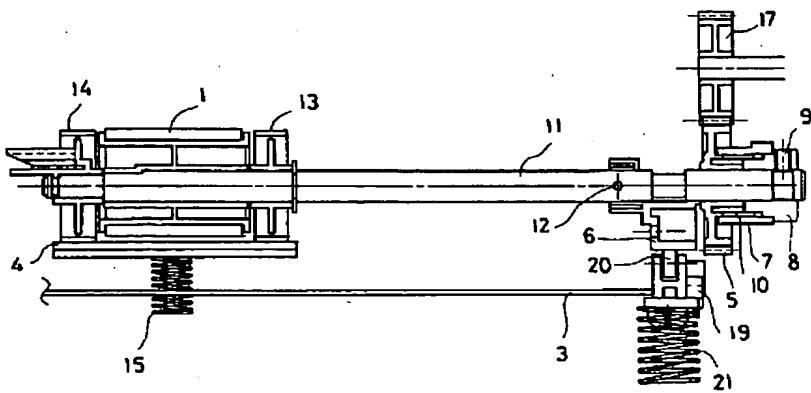
【図2】



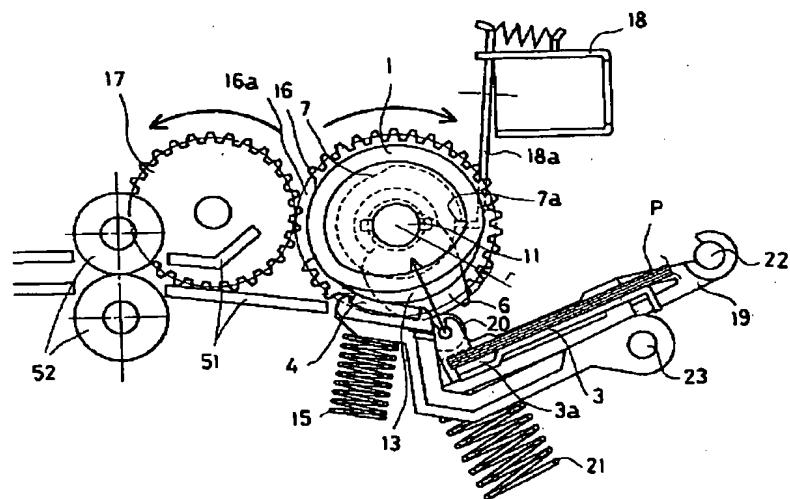
【図3】



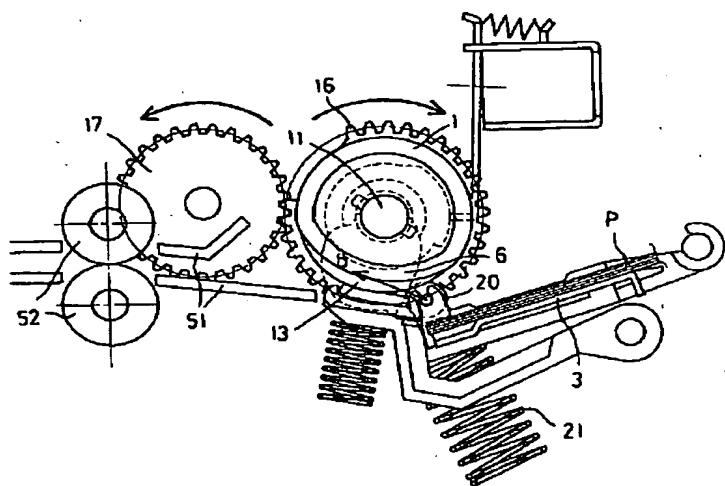
【図10】



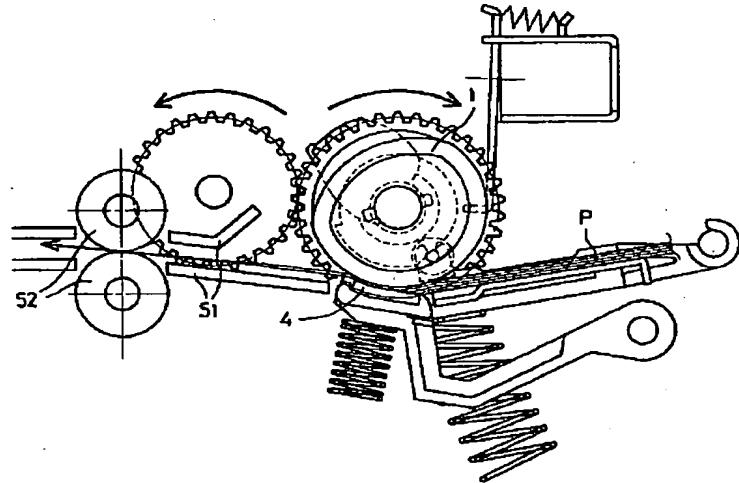
【図4】



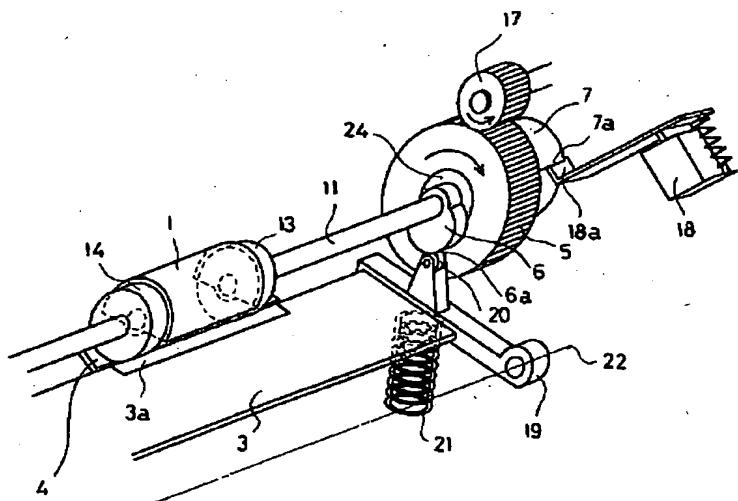
【図5】



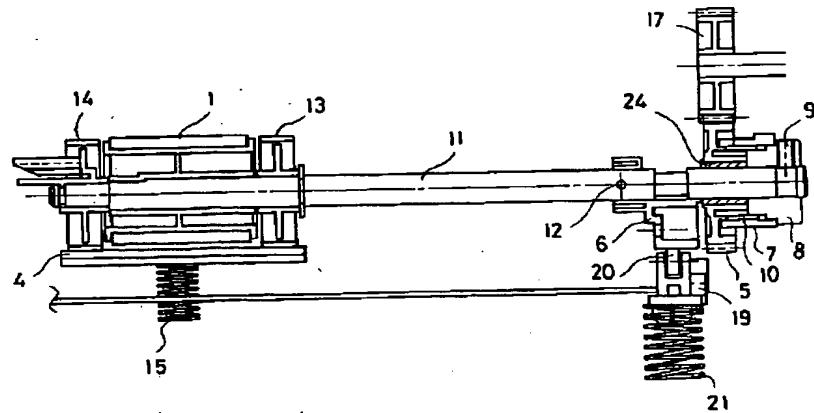
【図6】



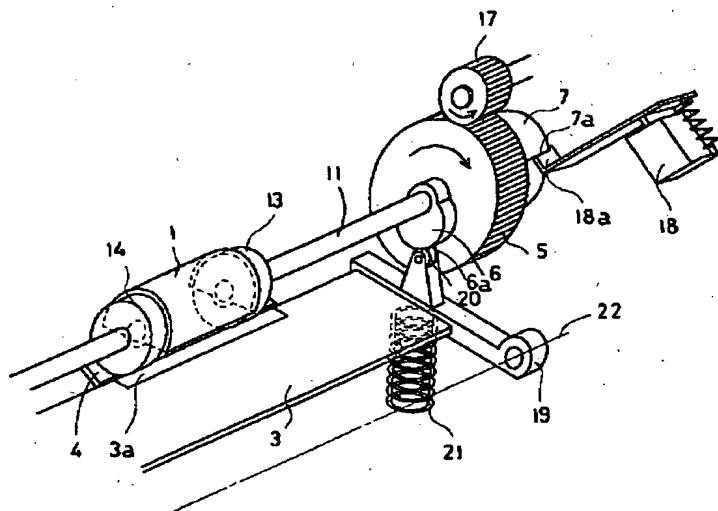
【図7】



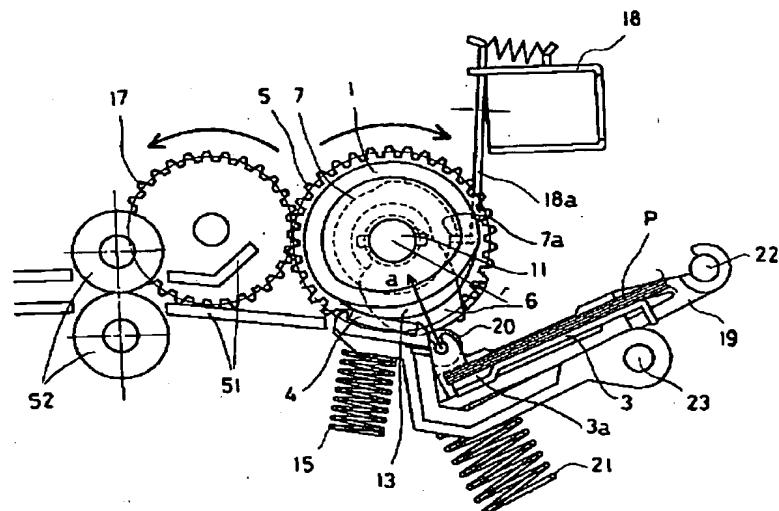
【図8】



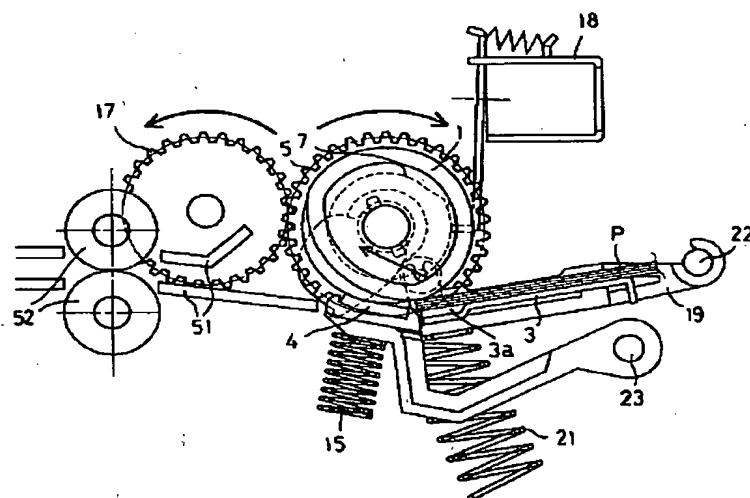
【図9】



【図11】



【図12】



フロントページの続き

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